Claims

1.   A system for detecting Zero Crossing Points (ZCPs) of phase back EMF in a brushless DC motor having a plurality of switching signals for commutating each of a plurality of phases of said brushless DC motor, said system comprising:

a ZCP level detection circuit for receiving terminal voltages of each of a plurality of phases of said brushless DC motor and a neutral voltage and for generating a ZCP level output for each of a plurality of phases of said brushless DC motor, said ZCP level output comprising a plurality of rising and falling edges corresponding to each Zero Crossing Point of a phase voltage for each of a plurality of phases of said brushless DC motor;

a pulse generator for receiving said plurality of ZCP level outputs and for generating a ZCP pulse signal, said ZCP pulse signal comprising a plurality of pulses corresponding to each of said plurality of falling and rising edge of said plurality of ZCP level outputs;

a first false ZCP masking signal for masking a first plurality of false ZCPs from said ZCP pulse signal and for generating a first masked ZCP signal, said first false ZCP masking signal comprises a plurality of pulses corresponding to said first plurality of false ZCPs;

and

a state comparator for comparing logic values of said ZCP level outputs corresponding to a plurality of pulses of said first masked ZCP signal, and for masking a second plurality of false ZCPs to generate a true ZCP signal;

wherein said plurality of pulses of said ZCP pulse signal is of a first predetermined width.

2.   The system in accordance with claim 1, wherein said first ZCP masking signal comprises a plurality of pulses corresponding to a change of state from ON to OFF of any of said plurality of phases of said brushless DC motor

3.   The system in accordance with claim 1, wherein said plurality of pulses of said first false ZCP masking signal is of a second predetermined width.

4.   The system in accordance with claim 2, wherein said second predetermined width being wider than said first predetermined width.

5.   The system in accordance with claim 2 wherein said state comparator masks away said second plurality of false ZCPs having a plurality of pulses each having a pulse having a same logic value as the preceding pulse of each of said plurality of pulses of said second plurality of false ZCPs.

6.   A method for detecting Zero Crossing Points (ZCPs) of phase back EMF in a brushless DC motor having a plurality of switching signals for commutating each of a plurality of phases of said brushless DC motor, said method comprises the steps:

a.   receiving a plurality of terminal voltages corresponding to a plurality of phase voltages of said brushless DC motor;

b.   generating a plurality of ZCP level outputs from said plurality of phase voltages;

c.   generating a ZCP pulse signal from said plurality of ZCP level outputs using a pulse generator;

d.   performing a first masking by masking said ZCP pulse signal using a first false ZCP masking signal, thereby removing a first plurality of false ZCPs and generating a first masked ZCP signal;

e.   performing a state comparison of logic values of said plurality of ZCP level outputs corresponding to a plurality of pulses of said first masked ZCP

signal to mask away a second plurality of false ZCPs and to generate a true ZCP signal;

wherein said plurality of pulses of said ZCP pulse signal is of a first predetermined width.

7. The method in accordance with claim 6, wherein said step a. further comprises receiving an actual neutral voltage or a self generated virtual voltage.

8. The method in accordance with claim 6, wherein said first false ZCP masking signal comprises a plurality of pulses corresponding to a change of state from ON to OFF of any of said plurality of phases of said brushless DC motor

9. The method in accordance with claim 6, wherein said plurality of pulses of said first false ZCP masking signal is of a second predetermined width.

10. The method in accordance with claim 9, wherein said second predetermined width being wider than said first predetermined width.

11. The method in accordance with claim 6, wherein said state comparator masks away said second plurality of false ZCPs having a plurality of pulses each having a pulse having a same logic value as the preceding pulse of each of said plurality of pulses of said second plurality of false ZCPs.